

## REMARKS

Claims 1-28 are pending in the application. Claims 1, 9, 17 and 22 are amended above to more clearly set forth what the Applicant regards as the invention. New claim 28 is also added to the application above. No new matter has been added to the application by way of these specification and claim amendments.

The examiner's prior art rejections are overcome or they are traversed as set forth below.

### I. THE ANTICIPATION REJECTIONS

#### A. The Rejection Of Claims 1-4, 9, 11-15 And 21 Over Hugenin

The examiner rejected claims 1-4, 9, 11-15 and 21 for being anticipated under 35 USC 102(b) by Hugenin (USP 5,047,783). Claim 1 is amended above to recite a detection device that measures different parts of a scene "without using said measurements in the formation of an image of the scene". This feature at least causes claim 1 to be novel over Hugenin.

The Hugenin device is clearly an imaging system – a device that creates an image. This feature of Hugenin is apparent from, for example, the reference title, the first line of the abstract, and from numerous references to imaging throughout the Hugenin patent. The feature of amended claim 1 that the device does not produce an image means that the device according to the present invention is greatly simplified as compared to Hugenin. Hence, the claimed device is much cheaper to produce. Indeed, the prior art such as Hugenin concentrates its efforts on producing the best quality images in order to detect certain materials. Whereas the inventors of the present invention have realised that this is not always necessary. By not including an imaging system the savings in expensive mm-wave receivers and subsequent processing is significant.

Claims 2-4, 9, 11-15 and 21 are novel over Hugenin by virtue of their dependency upon claim 1.

Claims 9 and 21 are further independently novel over Hugenin

Regarding claim 9, the local oscillator source (114 of Fig. 1 of Hugenin) is not a "reference source" as the term is used in the present invention. A local oscillator is used in a heterodyne receiver to downconvert the received signal to a (usually) lower frequency to facilitate further processing. The reference signal of the present invention is used instead for calibration purposes – a different use entirely. This difference has been made clear by amending

claim 9 above to expressly recite that the reference signal is used in device calibration. For this reason, claim 9 is novel and patentable over Hugenin.

Regarding claim 21, it is the examiner's position that Hugenin discloses an afocal telescope. However, the portions of Hugenin that the examiner alleges disclose this feature of claim 21 – col. 4 lines 57-60 - this does not appear to be the case. Indeed, the cited section of Hugenin discloses a detector array. For at least this reason, claim 21 is novel and patentable over Hugenin.

#### **B. The Rejection Of Claims 22-24 Over Chalfin**

The examiner rejected claims 22-24 for anticipation under 35 USC 102(b) over Chalfin (USP 3,784,899).

Claim 22 is amended above in a manner that emphasizes the difference between the claimed method and the methods disclosed in Chalfin. Firstly Chalfin uses two separate antennas to receive radiation from a single point on target (e.g., the ground). The present invention uses an antenna to measure (at least) two different regions. Thus the amount of information gathered in the present invention is greater, and the processing of the received signals is thus completely different to that of Chaffin. This difference is clarified in claim 22 as amended above. Chalfin does not disclose the comparison of readings from different regions. Instead it only looks at polarisation difference signals from a single point on the target. For at least this reason claims 22-24 are novel and patentable over Chalfin.

## **II. THE OBVIOUSNESS REJECTIONS**

#### **A. The Rejection Of Claims 5-7**

The examiner rejected claim 5-7 for being obvious over Hugenin as applied to claim 4 in view of Budil et al. (USP 6,101,015).

Claims 5-7 depend indirectly upon dependent claim 1. Claims 5-7 are non-obvious at least because Hugenin fails to disclose all of the features of claim 1 as set forth in Section I(A) above. Therefore, the combination of Hugenin and Budil et al. do not create a prima facie case of obviousness and claims 5-7 must be allowed.

Claims 5-7 are also independently non-obvious. The examiner claims that Budil et al. shows a fixed quarter wave plate and a moving quarter wave plate. The cited parts of Budil et al.

do not show this - they merely show use of fixed quarter wave plates. Budil et al. does not disclose moving wave plates.

Regarding claim 6, the examiner claims that Budil et al. at col. 10 lines 26-29 show a quarter wave plate fitted with polarising elements. The cited passage makes no mention of either a quarter wave plate or polarising elements. Claim 6 is independently non-obvious for this reason as well. .

Regarding claim 7, the examiner states that the moveable quarter wave plate is rotatably mounted. The portion of Budil et al. providing the basis for this position (col. 7 lines 46-53) actually says the opposite. Budil et al. lines 51-53 states, "The ring 60 is mounted to an inner tube 30 on threads 208 so that rotation of the ring 60 *does not result in rotation of the inner tube 200.* " Thus the quarter wave plate of Budil et al. is actually fixed, even when ring 60 is rotated. Even if it could rotate, then the rotation of Budil would be a very slow manual operation, completely different to the motorised high speed rotation of the current invention. There would thus be no motivation from even this misunderstanding of Budil. to incorporate it into Hugenin. And as has been said above, Hugenin is different to the current invention as claimed anyway.

**B. The Rejection Of Claim 8**

Claim 8 is patentable by virtue of its dependence – indirectly – upon allowable claim 1.

**C. The Rejection Of Claim 10**

The examiner rejected claim 10 for being obvious over Hugenin in view of Flint (USP 3,780,293). In particular, the examiner claims that Flint describes a light chopper as set forth in claim 10. This is not the case. Flint uses a reflective light chopper that periodically reflects radiation from a separate source onto a detector. The current invention as claimed in claim 10 instead uses a simpler system wherein the chopper comprises a “radiation absorbent material” (RAM). Thus a coating of RAM, being absorbent, is very different to that of Flint where the chopper is actually reflective and claim 10 is independently non-obvious for this reason.

Moreover, claim 10 is also non-obvious because the examiners rejection of claim 1 over Hugenin forms the foundation of this obviousness rejection. And because claim 1 is patentable over Hugenin, claim 10 is also patent by virtue of its dependence upon claim 1.

**D. The Rejection Of Claim 16**

The examiner rejected claim 16 for obviousness over Hugenin in view of the McLeod

article. Claim 16 is independently patentable because an Axicon has little relationship to the feature of claim 16.

McLeod only discloses an Axicon type refractive element. The Axicon is always used axially, and a further property is that all radial cross sections are equal in shape. Thus, rotation of the axicon would have no effect on the image. This is in contrast to the current invention as claimed in claim 16. Claim 16 uses different rotational positions to direct the radiation in different durations. A rotating axicon would not do this - the energy would always be directed to the axis. Therefore, the disclosure of an axicon by McLeod has little bearing on claim 16. A normally skilled person with knowledge of McLeod would not consider it for use in a scanning mechanism.

Moreover, claim 16 is also non-obvious because the examiners rejection of claim 1 over Hugenin forms the foundation of this obviousness rejection. And because claim 1 is patentable over Hugenin, claim 16 is also patent by virtue of its dependence upon claim 1.

#### **E. The Rejection Of Claim 17**

Regarding claim 17, the examiner claims that a parallel faced slab, or "GRIN lens" as described by Aono may be used in place of the prism of Hugenin to arrive at claim 17. It should be noted initially that a GRIN lens is not the same as a parallel faced slab (although the former may be made in the form of the latter) AGRIN lens is a lens (i.e. will refract a parallel beam by different amounts depending on the region the beam impacts upon its surface) just like any other lens. The parallel faced slab on the present invention is not a lens, as it does not have a finite focal length. This would be understood by a normally skilled reader of the application.

The examiner states that the lens of Aono is suitable for incorporation into Hugenin "because a grin lens can correct for spherical aberration, coma and curvature of field". The present invention does not use the parallel faced slab to perform any of these optical corrections - they are not relevant to its purpose. The parallel faced slab is used instead to move the point of focus of other lenses (e.g. lens 30 of figure 17) in the system. To clarify this, claim 17 has been amended as described above and amended claim 17 is non-obvious over the cited prior art.

Moreover, claim 17 is also non-obvious because the examiners rejection of claim 1 over Hugenin forms the foundation of this obviousness rejection. And because claim 1 is patentable over Hugenin, claim 17 is also patent by virtue of its dependence upon claim 1.

#### **F. The Rejection Of Claims 18-20**

Regarding claims 18-20, the examiner cites Hugenin in view of Bierleutgeb (US4586794) Bierleutgeb relates to a microscope, i.e. a field that is completely non-analogous to that of the present invention. Therefore, one of skill in the art at the time of the invention would not have combined Hugenin with Bierleutgeb to reach the invention of claims 18-20.

Moreover, claims 18-20 are also non-obvious because the examiners rejection of claim 1 over Hugenin forms the foundation of this obviousness rejection. And because claim 1 is patentable over Hugenin, claims 18-20 are also patent by virtue of its dependence upon claim 1.

#### **G. The Rejection Of Claims 25-26**

Regarding claims 25 and 26, the examiner cites Chalfin in view of Shrekenhamer as rendering the claims obvious. Claim 22 is shown in Section I(B) above not to be anticipated by Chalfin. Therefore claims 25-26 are not obvious because they both depend upon allowable claim 22.

Claims 25-25 are also non-obvious because Shrekenhamer does not disclose a key feature of the current invention - it does not use information from multiple regions in its processing. Each scan it does is of a single region. A result (mine detected, or mine not detected) is given based upon the scan of that single region. The present invention (as described in base claim 22) provides a result based on a comparison of readings from two or more different regions. Thus the present invention collects more information in forming a result, which leads to much greater accuracy. Also, Shrekenhamer is again a microwave system, rather than a millimetre wave system. For each of these reasons, claims 25-26 are patentable because the combination of Hugenin and Shrekenhamer do not disclose every feature of the claims.

#### **H The Rejection Of Claim 27**

Claim 22 is shown in Section I(B) above not to be anticipated by Chalfin. Therefore claim 27 is patentable because it depends upon allowable claim 22.

### **III. NEW CLAIM 28**

New independent claim 28 is added to the application above. New claim 28 is similar to claim 1 but instead of including a beam steerer, it includes optics for changing the beamwidth. Claim 28 is believed to be patentable over the recited prior art.

## CONCLUSION

Pending application claims 1-28 are believed to be patentable for the reasons recited above. Favorable reconsideration and allowance of all pending application claims is courteously solicited.

Respectfully submitted,

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